

What is claimed is:

1. A bidirectional optical module comprising:

a light receiver, wherein a photo acceptance unit is optically coupled  
5 with a light output part obtained by cutting an optical fiber in the  
middle thereof aslant a core of the optical fiber, and inserting a filter or  
a half mirror between obtained cross sections of the core; and  
a light transmitter, wherein a light emitting device is optically coupled  
with one end of the optical fiber,

10 wherein the light receiver is set to have a receptacle structure, which  
comprises a ferrule, in which the other end of the optical fiber is  
inserted from inside, and which can physically contact with an optical  
connector.

15 2. A bidirectional optical module comprising:

a light receiver, wherein a photo acceptance unit is optically coupled  
with a light output part obtained by partly forming a cutting part to  
expose part of a lateral face of an optical fiber in a ferrule having a  
thorough-hole to insert the optical fiber, letting the optical fiber  
20 through the ferrule, forming a slit at the cutting part, forming cross  
sections aslant a core of the optical fiber, and inserting a filter or a half  
mirror between the cross sections of the core; and  
a light transmitter, wherein a light emitting device is optically coupled  
with one end of the optical fiber,

25 wherein a part protruding from an end face of the ferrule on the other

end side of the optical fiber is cut, an end face of the ferrule on the side opposite of the light transmitter-connected side is polished so that the ferrule can physically contact with an optical connector, and the light receiver is set to have a receptacle structure.

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3. The bidirectional optical module according to claim 1 or 2, wherein the photo acceptance unit of the light receiver is mounted on the same slave substrate as a subsequent circuit is, and the slave substrate and a master substrate on which the module is mounted are electrically connected by a flexible wiring substrate.

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4. The bidirectional optical module according to claim 3, wherein the slave substrate is formed of a three-dimensional substrate.

5. The bidirectional optical module according to claim 4, wherein the three-dimensional substrate has a shape available to engage with a locking piece of an optical connector adapter.

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6. The bidirectional optical module according to claim 1 or 2, wherein an index matching resin which is cured by ultraviolet is filled on a light path from the light output part to the photo acceptance unit, and the ferrule is made of a material transparent to ultraviolet by which the index matching resin is cured.

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7. A bidirectional optical module comprising:

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a light receiver, wherein a photo acceptance unit is optically coupled with a light output part obtained by facing a slope of a first optical fiber whose at least one end is a slope and a slope of a second optical fiber whose at least one end is a slope so that they are optically coupled,  
5 and inserting a filter or a half mirror between the facing both slopes of an optical fiber core; and

a light transmitter, wherein a light emitting device is optically coupled with an end of the second optical fiber on the side opposite of the light output part,

10 wherein a ferrule which has a through-hole to insert the optical fiber and which can physically contact with an optical connector is provided at one end of the first optical fiber on the side opposite of the light output part, the ferrule and the light receiver are integrated, and the light receiver is set to have a receptacle structure.

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8. A bidirectional optical module comprising:

a light receiver, wherein a photo acceptance unit is optically coupled with a light output part obtained by,

forming a cutting flat part to expose part of a lateral face of a first  
20 optical fiber on one end of a first ferrule having a through-hole to insert the first optical fiber, letting through the first optical fiber, and cutting parts thereof protruding from both ends of the first ferrule,

forming a cutting flat part to expose part of a lateral face of a second optical fiber on one end of a second ferrule having a through-hole to

25 insert the second optical fiber, letting through the second optical fiber,

and cutting only a part thereof protruding from the cutting flat part side of the second ferrule,

processing optical fiber ends of the first and the second optical fibers on their cutting flat part sides in the slope shape at an angle that the first optical fiber and the second optical fiber are optically coupled, when  
5 the cutting flat parts of the first ferrule and the second ferrule are faced so that they are on the same level, and

facing the cutting flat part sides of the first ferrule and the second ferrule so that they are on the same level, and inserting a filter or a  
10 half mirror between the both slopes of an optical fiber core; and

a light transmitter, wherein a light emitting device is optically coupled with an end of the second optical fiber on the side opposite of the light output part,

wherein an end face of the first ferrule on the side opposite of the  
15 cutting flat part is polished to allow the ferrule to physically contact with an optical connector, and the light receiver has a receptacle structure.

9. The bidirectional optical module according to claim 7 or 8,  
20 wherein the photo acceptance unit of the light receiver is mounted on the same substrate as a subsequent circuit is, and the slave substrate and a master substrate on which the module is mounted are electrically connected by a flexible wiring substrate.

25 10. The optical transmission device, on which the bidirectional

optical module according to any one of claims 1, 2, 7, and 8 is mounted.

11. An optical drop module comprising:

a light receiver, wherein a photo acceptance unit is optically coupled  
5 with a light output part obtained by cutting an optical fiber in the  
middle thereof aslant a core of the optical fiber, and inserting a filter  
between obtained cross sections of the core,

wherein an optical connector is provided at one end of the optical fiber,  
a ferrule available to physically contact with an optical connector is  
10 provided on the other end, the ferrule and the light receiver are  
integrated, and the light receiver is set to have a receptacle structure.

12. An optical drop module comprising:

a light receiver, wherein a photo acceptance unit is optically coupled  
15 with a light output part obtained by partly forming a cutting part to  
expose part of a lateral face of an optical fiber in a ferrule having a  
through-hole to insert the optical fiber, letting the optical fiber through  
the ferrule, forming a slit at the cutting part, forming cross sections  
aslant a core of the optical fiber, and inserting a filter between the  
20 cross sections of the core,

wherein an optical connector is provided at one end of the optical fiber,  
a part protruding from an end face of the ferrule on the other end side  
of the optical fiber is cut, an end face of the ferrule on the side opposite  
of the optical connector-provided side is polished so that the ferrule can  
25 physically contact with an optical connector, and the light receiver is

set to have a receptacle structure.

13. The optical drop module according to claim 11 or 12, wherein the photo acceptance unit of the light receiver is mounted on the same slave substrate as a subsequent circuit is, and the slave substrate and  
5 a master substrate on which a module is mounted are electrically connected by a flexible wiring substrate.

14. The optical drop module according to claim 13, wherein the  
10 slave substrate is formed of a three-dimensional substrate.

15. The optical drop module according to claim 14, wherein the three-dimensional substrate has a shape to engage with a locking piece of an optical connector adapter.

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16. The optical drop module according to claim 11 or 12, wherein an index matching resin which is cured by ultraviolet is filled on a light path from the light output part to the photo acceptance unit, and the ferrule is made of a material transparent to ultraviolet which cures the  
20 index matching resin.

17. An optical drop module comprising:  
a light receiver, wherein a photo acceptance unit is optically coupled with a light output part obtained by facing a slope of a first optical  
25 fiber whose at least one end is a slope and a slope of a second optical

fiber whose at least one end is a slope so that they are optically coupled,  
and inserting a filter between the both slopes of an optical fiber core,  
wherein an optical connector is provided at an end of the second optical  
fiber on the side opposite of the light output part, a ferrule which has a  
5 through-hole to insert the optical fiber and which can physically  
contact with an optical connector is provided at an end of the first  
optical fiber on the side opposite of the light output part, the ferrule  
and the light receiver is integrated, and the light receiver is set to have  
a receptacle structure.

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18. An optical drop module comprising:

a light receiver, wherein a photo acceptance unit is optically coupled  
with a light output part obtained by,

forming a cutting flat part to expose part of a lateral face of a first  
15 optical fiber on one end of a first ferrule having a through-hole to insert  
the first optical fiber, letting through the first optical fiber, and cutting  
parts thereof protruding from both ends of the first ferrule,

forming a cutting flat part to expose part of a lateral face of a second  
optical fiber on one end of a second ferrule having a through-hole to  
20 insert the second optical fiber, letting through the second optical fiber,  
and cutting only a part thereof protruding from the cutting flat part  
side of the second ferrule,

processing optical fiber ends of the first and the second optical fibers on  
their cutting flat part sides in the slope shape at an angle that the first

25 optical fiber and the second optical fiber are optically coupled, when

the cutting flat parts of the first ferrule and the second ferrule are  
faced so that they are on the same level, and  
facing the cutting flat part sides of the first ferrule and the second  
ferrule so that they are on the same level, and inserting a filter  
5 between the both slopes of an optical fiber core,  
wherein an optical connector is provided at one end of the second  
optical fiber on the side opposite of the light output part, an end face of  
the first ferrule on the side opposite of the cutting flat part is polished  
to allow the ferrule to physically contact with an optical connector, and  
10 the light receiver is set to have a receptacle structure.

19. The optical drop module according to claim 17 or 18, wherein  
the photo acceptance unit of the light receiver is mounted on the same  
slave substrate as a subsequent circuit is, and the slave substrate and  
15 a master substrate on which the module is mounted are electrically  
connected by a flexible wiring substrate.

20. The optical transmission device, on which the optical drop  
module according to any one of claims 11, 12, 17, and 18 is mounted.